

*CO-WORKER IMPLEMENTED JOB TRAINING:  
THE USE OF COINCIDENTAL TRAINING AND QUALITY-CONTROL  
CHECKING ON THE FOOD PREPARATION SKILLS OF  
TRAINEES WITH MENTAL RETARDATION*

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In two studies, co-workers of persons with disabilities were taught to use coincidental training procedures while completing their own jobs. In Study 1, the effects of coincidental training on the salad-making skills of 3 trainees with mild and moderate mental retardation were evaluated. Coincidental training by co-workers resulted in improved accuracy of the salad-making skills of the trainees. In Study 2, trainees were also coincidentally taught to make quality-control checks of their salads. An alternating treatments and multiple baseline design indicated that the trainees more readily acquired the skills when taught to check the correctness of their work.

DESCRIPTORS: coincidental teaching, employment, vocational training, co-worker trainers, transition, handicapped, mentally retarded, self-monitoring, quality control

Over the past decade, competitive employment has become a vocational alternative to sheltered workshops and day programs for individuals with mental retardation (Kerachsky & Thornton, 1987; Salzberg, Likins, McConaughy, & Lignugaris/Kraft, 1986). Successful supported employment programs such as the McDonald's Project (Brickey & Campbell, 1981), the University of Washington Food Service Training Program (Sowers, Thompson, & Connis, 1979), and the Virginia Commonwealth University Supported Work Model (Wehman & Kregel, 1985) are characterized by structured job placement, on-site training, and extensive client follow-up. A job coordinator or trainer is assigned to each client and is responsible for all facets of the placement, training, and follow-up process. Although supported work programs can be quite cost effective over time (Hill, Hill, & Wehman, 1985; Schneider, Rusch, Henderson, & Geske, 1982; Shestakofsky, 1987), initial implementation costs may be prohibitive for many service programs

(Sowers et al., 1979). Moreover, follow-up activities may require the job trainer to return to the job site over an indefinite period to help employees with handicaps adjust to changing job requirements (Ford, Dineen, & Hall, 1985; Wehman & Kregel, 1985).

Co-workers are indigenous to the employment setting, are well acquainted with the job, and thus may provide a normative and cost-effective alternative to a professional job trainer (DeMars, 1975; Levine, 1981; Rusch & Menchetti, 1981; Rusch & Minch, 1988; Rusch, Weithers, Menchetti, & Schutz, 1980; Shafer, 1986; Wehman, 1981).

One strategy that appears well suited for co-worker training is coincidental training (Oswald, Lignugaris/Kraft, & West, 1988; Stowitschek et al., 1985), which is a variation of the incidental teaching process developed by Hart and Risley (1968, 1974, 1975). Incidental teaching refers to an arrangement in which a teacher or trainer capitalizes on opportunities to prompt and reinforce desired responses in the natural environment. Coincidental training varies from incidental teaching in that additional opportunities for interaction are planned by the instructor and are inserted into the schedule of activities (Stowitschek et al., 1985). Coincidental training procedures have been used to teach social amenities to adults with mental retar-

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dation in a work activity center (Stowitschek, McConaughy, Peatross, Salzberg, & Lignugaris/Kraft, 1988) and to develop social interaction skills in preschool children (Schulze, Rule, & Innocenti, 1989; Stowitschek *et al.*, 1985).

The purpose of the present studies was to examine the feasibility of training co-workers to use coincidental training procedures in a competitive employment site. Co-worker trainers interspersed brief training episodes while trainees were engaged in their ongoing work activities. In Study 1, the effects of coincidental training by co-workers on the acquisition of salad-making skills of trainees with mental retardation were investigated. The impact of conducting coincidental training on the co-workers' rate of work was also examined. Study 2 replicated the first study and examined the coincidental training procedure with and without a quality-control checking component.

## STUDY 1

### METHOD

#### *Participants*

*Trainees with disabilities.* Three women with mild mental retardation, employed at a local sheltered workshop, participated in the study. Linda, 24 years old, had a full-scale WAIS IQ of 67. She lived at home and had been employed at the workshop for approximately 2 years. Linda was absent frequently and had a low rate of task completion at the workshop. She had never been competitively employed.

Shirley, 32 years old, had a full-scale WAIS IQ of 54. She lived at home and had been employed at the workshop for approximately 15 years. Shirley was one of the top producers at the workshop and was selected frequently to participate on work crews. Due to poor social skills, however, Shirley had not been considered for competitive employment.

Mary, 25 years old, had a full-scale WAIS IQ of 66. She was married, lived in an apartment with her husband, and had been employed at the workshop for 10 years. Placement records indicated that she was employed previously by a local company but lost her job because of inappropriate social

behavior. Prior to the study, the 3 women indicated that they wanted to work outside the workshop and were interested in learning salad preparation and cleanup skills. As trainees, they were paid a minimum wage of \$3.35/hour throughout the study.

*Co-worker trainers.* Two university students were hired to serve as co-workers and data collectors. Prior to the study, both co-worker trainers had worked part-time in another self-service restaurant on campus but had no experience with persons with mental retardation. The students were similar to other co-workers in that they had specific tasks to complete, worked 3 to 4 hours per day, were paid wages comparable to other co-workers, were university students like most other part-time workers in the setting, and received directions and some supervision from the department supervisor. However, the students were paid through the research project rather than the restaurant budget, were supervised primarily by the research coordinator, and their activities were restricted to the salad preparation area of the cafeteria.

#### *Setting*

Research was conducted in the food preparation area of a self-service cafeteria in the student union of a university. The food preparation area was a large, open kitchen divided into three departments: hot foods, pastry, and salads. Training occurred in the department where salads and appetizers were prepared. Regular employees continued to work in the salad area throughout the study preparing assorted salads and appetizers. The co-workers and the trainees worked at a large wooden chopping table that was perpendicular to the tables occupied by the other salad makers.

#### *Task and Measurement*

Preparation of a chef salad involving 19 steps was the target task. The steps of the task and examples of the criteria used in assessing the accuracy of these steps are described in Table 1.

Work performance was assessed during daily test sessions by having the trainees complete one chef salad without trainer assistance. Test session length

was determined by the time each trainee required to complete one salad, usually 20 to 25 min.

Performance accuracy in training and test sessions was assessed using a checklist to record the number of steps completed without assistance. A step was recorded as accurately performed if the trainee completed the step according to criteria without assistance. In addition, the time required to complete a test salad was recorded. Timing began when the co-worker told the trainee to make a salad and ended when the trainee completed the final step.

*Co-worker work rate.* In most jobs, co-workers need to complete their own work while training new employees. To assess whether training adversely affected co-workers' work rate, co-workers prepared small lettuce salads during training (such salads were often prepared by food service workers). Observers recorded the number of salads prepared by co-workers during the first 10 min of each training session throughout the study. The co-workers also assisted the regular employees with additional tasks upon request of the departmental supervisor and engaged in preparation and cleanup tasks when not training.

*Interobserver agreement.* Interobserver agreement on the accuracy of salads and time to complete salads was taken on 65% of the sessions for all participants across each condition. During reliability checks, a second observer recorded the trainees' performance, independent of the primary observer. Data recorded by the two observers were compared on a step-by-step basis. Percentage of agreement for each session was calculated by dividing the number of agreements by the total number of agreements plus disagreements and multiplying by 100. The percentage of agreement on accuracy ranged from 74% to 100%, with a mean of 94%.

Interobserver agreement on trainees' time to complete a salad also was assessed. A second observer timed each task independently, and an agreement was scored if the recorded times were within 30 s of each other. The mean percentage of agreement across experimental conditions for each observer was 98%.

In addition, agreement on the co-workers' work rate was assessed by having two observers inde-

Table 1  
19 Steps and Examples of Criteria to Complete a Chef Salad

Step	Step description
1	Place 4–5 lettuce leaves on plate. Example: a. Place broad fan of leaf on edge of plate. b. Leaves should cover edge of plate. c. Leaves may extend beyond edge of plate but should not touch table.
2	Place handful of shredded lettuce in center of plate and form mound.
3	Cut three slices of ham.
4	Cut slices into strips.
5	Place ham lengthwise on mound in groups of four.
6	Cut one slice of cheese. (Cheese is presliced lengthwise and produces strips when cut.)
7	Place four groups of cheese lengthwise between groups of ham. Example: a. Groups should consist of four strips of cheese. b. Cheese strips should overlap but not be stacked directly on top of one another. c. Strips should be centered between groups of ham. d. Strips should not extend beyond edge of plate.
8	Cut an egg in half lengthwise.
9	Sprinkle paprika on yolk side of each egg half.
10	Place egg halves on opposite sides of plate.
11	Cut tomato in half lengthwise.
12	Core one half of tomato.
13	Slice tomato half into three wedges.
14	Place two wedges of tomato on opposite sides of plate.
15	Place sprouts on top of salad. Example: a. Approximately $\frac{1}{4}$ cup of sprouts should be used. b. Sprouts should cover ends of ham and cheese strips. c. Sprouts should be heaped, not flattened.
16	Place two spears of asparagus on opposite sides of plate.
17	Cut and core a slice of green pepper.
18	Place ring on top of sprouts.
19	Place four olives inside ring of pepper.

pendently record the number of salads completed during training sessions. Agreement was calculated by dividing the smaller number of salads recorded by the larger number and multiplying the result by 100. The percentage of agreement was 100%.

### *Co-worker Training*

Prior to the study, a three-phase training procedure was used to prepare the university students to be trainers and observers. First, they were taught performance standards for each step of the salad preparation by observing workers prepare salads at the work site. Another individual, not involved in training, acted as primary observer. A criterion of 85% agreement with the primary observer for 3 consecutive days was required before moving to Phase 2. Co-workers required approximately 20 to 25 hr over 3 to 4 weeks to reach this criterion.

Second, co-workers recorded the salad-making skills of a worker with disabilities (not involved in the study) and co-worker training behaviors demonstrated by the experimenter. Training behaviors included step-specific instructions, modeling, physical prompts, practice, and praise. It took co-workers approximately 10 to 15 hr over 2 to 3 weeks to reach a criterion of 85% agreement for 3 consecutive days with the primary observer.

Third, co-workers role-played coincidental training procedures with the experimenter and each other. A criterion of 100% across all steps of the task for 3 days was required before beginning the study (approximately 10 to 15 hr).

Actual training sessions were audiotaped to verify the content of the teaching interactions. The tapes were examined for sequence of steps and use of training procedures. If a discrepancy existed between recommended training and actual training, the project coordinator replayed the tape with the co-worker on the following day, discussed the problem, and practiced the correct procedure. Training sessions were recorded daily until co-workers were performing consistently (approximately five or six sessions). Thereafter, training sessions were audiotaped weekly.

### *Procedures and Design*

Trainees made two chef salads every day. Each trainee prepared the first salad independently during a test session. The second salad was made during a training session. During both sessions, the co-worker placed a model salad in front of the trainee before beginning work.

The trainees were exposed to five experimental conditions: (a) baseline, (b) coincidental training, (c) coincidental training plus quality-control checking, (d) 2-day maintenance checks, and (e) weekly maintenance checks.

*Baseline.* During the first baseline session, co-workers demonstrated and described each step in making the chef salad. Following the demonstration, co-workers began to work on their own task, filling bowls with salad. No other instructions specific to the task were provided by the co-workers, although at times it was necessary to instruct the trainees on safety procedures (e.g., "Keep your eyes on the knife.") or to answer specific questions about materials (e.g., "Yes, go ahead and use the new block of cheese."). Once the trainee completed the salad, the co-worker provided verbal feedback on the accuracy of each step performed. The feedback consisted of descriptive praise for steps performed correctly and suggestions to improve incorrect steps. For example, if the trainee put too much paprika on an egg, the co-worker said, "You used too much paprika. Next time make it look like this" (pointing to the egg on the model salad).

For each succeeding baseline session, co-workers placed a completed chef salad in front of the trainees and said, "Go ahead and get started on your salad. Try to make it look just like this" (pointing to the model salad). The co-workers then began to fill bowls with salad. Following completion of the salad, the co-workers provided feedback.

*Coincidental training.* During coincidental training, co-workers provided brief training contacts (1 to 5 min) while trainees were preparing salads. Initially, co-workers trained four of the 19 steps completed by the trainee. When a trainee completed a step correctly on three of four consecutive sessions, a new step was added the following session. A maximum of eight steps were trained during a session. When a trainee achieved 100% accuracy on a step on five of six consecutive sessions, the co-worker monitored these steps in subsequent sessions and applied additional training procedures if the trainee's performance deteriorated.

Training for each step was dependent on the trainee's performance. If a targeted step was per-

formed correctly, the co-worker praised the trainee. If a step was incorrect, the co-worker provided training. The training sequence consisted of providing a verbal description, modeling a particular step, having the worker practice the step, providing corrective feedback as necessary, and praising a correct response.

The training used for each step varied according to the trainee's performance on the previous day. For example, a trainee learning a new step was provided with a full training sequence (i.e., instructions and modeling, instructions and practice, praise and continue to next step or repeat if necessary), whereas a trainee who had met performance criterion for a step on four previous sessions was given only a verbal instruction to correct the response (e.g., "That leaf is touching the table; pull it in.") followed by praise for a correct response. The targeted steps and corresponding training sequence were predetermined by the research coordinator and specified on a training checklist placed in view of the co-worker.

*Coincidental training plus quality-control checking.* In addition to the training procedures described for Phase 1, co-workers provided a model for each step trained. That is, if a step was targeted for a full training sequence, the co-worker demonstrated the correct response prior to the trainee's attempt. Further, co-workers taught trainees to check the accuracy of each step before they received corrective feedback from the co-worker. For each step, trainees were taught to discriminate common errors, such as a lettuce leaf touching the table. After training a step, the co-worker modeled the checking procedure and demonstrated how to correct errors. After trainees completed a targeted step the co-workers provided feedback regarding accuracy. When a trainee met criteria on all the steps during test sessions, the first maintenance condition was introduced.

*Two-day maintenance checks.* During this condition, trainees completed one test salad every other day. On these days, a model of the salad was placed in front of the trainees, and they were instructed to make a salad like the model. The co-worker provided feedback about the accuracy of each step

after the salad was completed. When performance was maintained at a minimum of 80% correct for at least 2 consecutive weeks, a weekly maintenance phase was introduced.

*Weekly maintenance checks.* Trainees completed one test salad each week. As in the previous condition, no instructions were given and feedback was provided after the salad was completed.

*Experimental design.* A multiple baseline across trainees was used to assess the effects of coincidental training by co-workers on the trainee's performance.

### *Social Validation of Trainee Performance*

Two types of social validity data were collected. First, two managers in the salad department of the restaurant evaluated salads produced by the trainees during test sessions. Using a checklist, managers were asked to determine whether each part of the salad met their own standards, whether they would sell the salad, and whether they would continue to train that worker. Managers evaluated a minimum of three salads for each trainee during each experimental condition.

Second, using a normative comparison procedure (Kazdin, 1982), four experienced workers without disabilities were observed to determine their average rate of salad completion. Comparisons of production rate were made between the trainees and the experienced workers to determine whether the behavior changes produced by the training procedure reached competitive performance levels.

## RESULTS

### *Accuracy*

Figure 1 presents the mean percentage of steps completed correctly by the trainees during blocks of three consecutive test sessions. During baseline, Linda correctly completed an average of 23% of the steps per salad. Shirley and Mary correctly completed an average of only 10% and 9% of the steps per salad, respectively.

When coincidental training was introduced, Linda's percentage of correct steps increased with each session up to the 21st session. At that point, it appeared to stabilize for the final 15 sessions of the condition at about 60% of the steps correct per

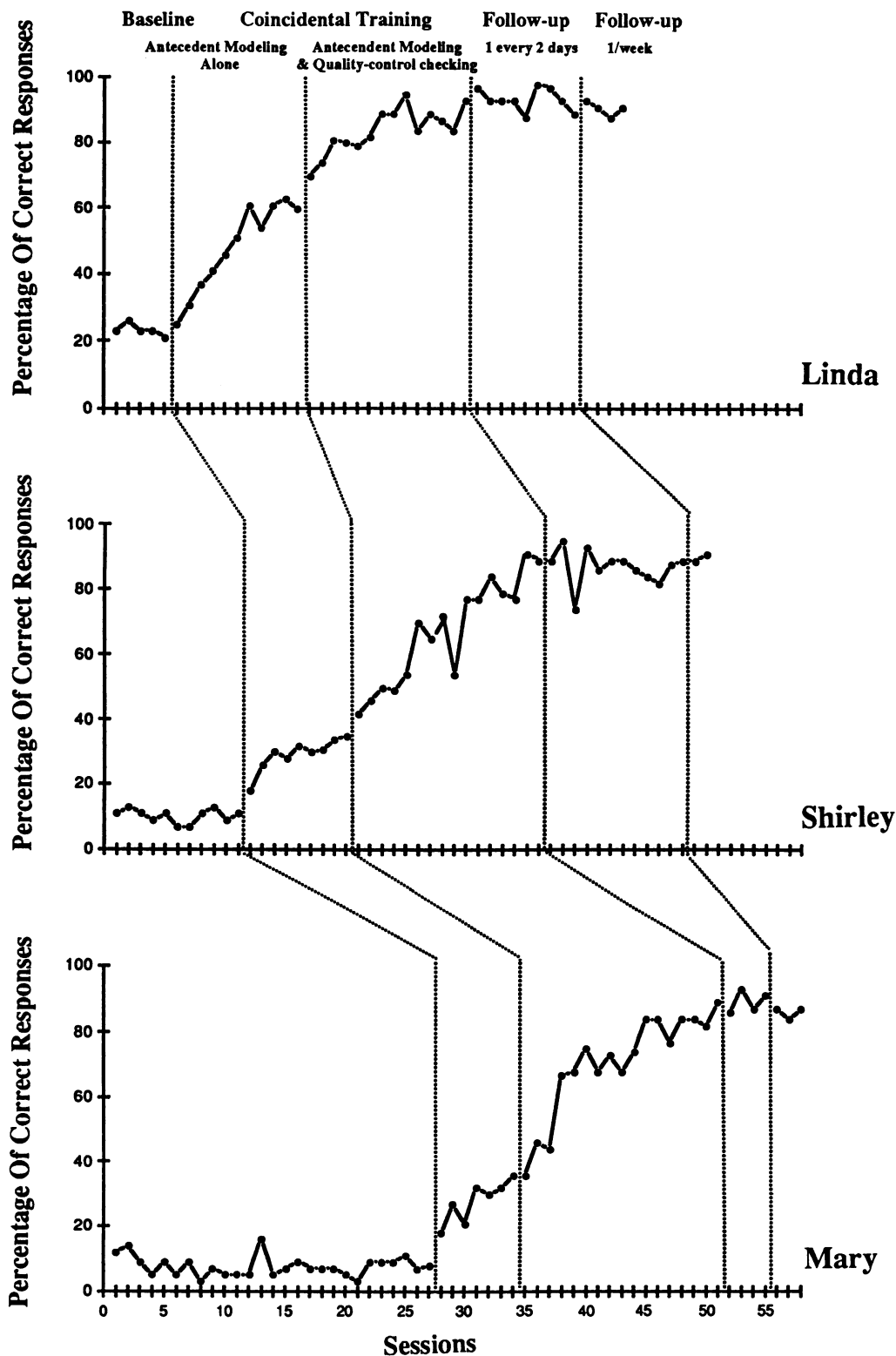


Figure 1. Mean percentage of salad steps completed correctly during test sessions for Linda, Shirley, and Mary.

salad. Shirley and Mary averaged 33% of the steps correct per salad at the end of the first training condition after 4 to 5 weeks of training.

When the coincidental training plus quality-control checking condition was introduced, Linda's mean performance level gradually increased to 90%. Shirley and Mary correctly completed approximately 90% of the steps by the end of this condition. Performance levels were sustained throughout maintenance.

### *Time to Complete a Salad*

During baseline, it took Linda an average of 10.8 min to complete a chef salad; Shirley and Mary averaged 4.7 and 4.1 min per salad, respectively. When coincidental training was introduced, mean time to complete salads increased concurrently with increases in accuracy. During maintenance, Linda's, Shirley's, and Mary's time improved to 16.3, 15.2, and 14.3 min per salad, respectively.

### *Co-worker Work Rate*

Co-workers prepared an average of five salads per minute (range, 4 to 10 bowls per minute) during baseline. The co-workers' mean rate of filling salad bowls decreased to an average of three to four salad bowls per minute during the coincidental training condition and returned to an average of five salads per minute during the coincidental training plus quality-control checking condition.

### *Social Validation*

Supervisors evaluated the trainees' test salads for correctness and judged whether the salad could be sold and whether further training was warranted. During baseline, supervisors indicated that only a small percentage of Linda's, Shirley's, and Mary's test salads were completed correctly: 35.7%, 17.0%, and 14.2%, respectively. All of Linda's salads were judged as saleable but in need of improvement, whereas none of Mary's and Shirley's salads were considered saleable. During coincidental training, the mean percentage of salad steps judged as correct for Mary increased to 21%. The percentage of salad steps by Linda and Shirley judged as correct dou-

bled to 76.5% and 33.3%, respectively. However, supervisors' opinions of the saleability of the test salads were unchanged.

During the second coincidental training condition, all of Linda's and Shirley's salads were considered saleable by the managers as were three of four of Mary's salads. However, the supervisors still indicated that the trainees could benefit from further training. During the maintenance conditions, supervisors considered all test salads as saleable and noted that minimal or no training was necessary.

### DISCUSSION

Results suggest that the use of coincidental training procedures by co-workers increased the salad-making skills of 3 trainees with mild mental retardation. Further, once the trainees met performance criteria and training was withdrawn, they maintained high levels of performance for 6 to 8 weeks. In addition, this study suggests that co-workers might use a coincidental training approach to teach trainees a complex kitchen task without substantially decreasing their own production.

It seemed that the addition of quality-control checking to the coincidental training procedure resulted in more rapid and complete acquisition of salad-making steps than use of the coincidental training procedure alone. However, two confounding variables in Study 1 precluded comparing the relative effectiveness of the two intervention conditions. First, all trainees were exposed initially to the basic coincidental training condition, which was then followed by the coincidental training plus quality-control checking condition. Thus, the relative effectiveness of the second intervention may have resulted from the cumulative impact of the intervention sequence. Second, new steps to be trained were added only as old steps were learned to criteria. For this reason, steps learned more rapidly (i.e., easier steps) tended to be differentially represented in the first intervention condition whereas more difficult steps were retained longer in training and, thus, were more heavily represented in the second intervention.

The purpose of Study 2 was to replicate the first

study and determine whether coincidental training with quality-control checking would result in more rapid acquisition of salad-making skills than the coincidental training procedure alone.

## STUDY 2

### METHOD

#### *Participants*

*Trainees with disabilities.* Three women with mild or moderate mental retardation from a local sheltered workshop participated in the study. Marcia, 23 years old, had a full scale WAIS IQ of 55. She lived at home and had been employed at the workshop for approximately 1 year. Marcia had not been considered for competitive employment due to absenteeism and a low rate of production.

Doris, 24 years old, had a full-scale WAIS IQ of 51. She had lived in a group home for 2 years and had been employed at the workshop for 7 years. Doris had a low rate of production and had never been competitively employed.

Lois, 23 years old, had a full-scale WAIS IQ of 66. She lived with her parents and had been employed at the workshop for 4 years. Lois had a low rate of production and frequently relied on peers to help her complete tasks at the workshop. She had never been competitively employed. None of the participants had prior training in food preparation. All 3 women indicated that they were interested in working away from the workshop and wanted to save money for room and board and personal expenses. They received a minimum wage of \$3.35/hour throughout the study.

#### *Co-worker Trainers*

Two university students were hired to serve as co-worker trainers and data collectors. Prior to the study, both students had held a number of part-time jobs in restaurants while attending school. Neither student had prior experience with persons with developmental disabilities. Their job description and co-worker characteristics were the same as those described in Study 1. Both co-workers were trained using the same procedures described in Study 1.

#### *Setting*

The site was the same food preparation area described in Study 1.

*Task and measurement.* The task selected for training was the chef salad described in Study 1. Three of the 19 steps were performed consistently by the participants during baseline and, therefore, were not included in the training sequence for Study 2. The remaining 16 steps were divided into two groups of eight steps using the following procedure. First, the 16 steps were ordered according to level of difficulty based on the number of sessions required for acquisition in Study 1. Second, the steps were assigned alternately to the first or second half of the training curriculum.

The measures for this study were the same as those described in Study 1 with the addition of a measure of the occurrence of quality-control checking for trainees. A quality-control check consisted of two components: (a) step-specific checking behavior and (b) error correction. Checking behavior was recorded if the worker performed the checking procedure after completing a step. For example, an observer recorded checking behavior for Step 1 (placing lettuce leaves on plate) if, after placing the leaves, the trainee leaned over the edge of the table while turning the salad plate in a circle and looked at the leaves. An error correction was recorded if a trainee corrected one or more errors. For example, in Step 1, an error correction would be recorded if the trainee pulled in leaves that were touching the table or repositioned leaves to cover the plate. Trainees' performance was assessed daily during 20- to 25-min test sessions immediately prior to each training session. In addition, co-workers' work rate was assessed daily during training sessions.

*Interobserver agreement.* Interobserver agreement on the measures of accuracy and time to complete a salad was assessed for all participants across each phase of the study in the same manner as Study 1. The percentage of agreement on accuracy ranged from 84% to 100%, with a mean of 95.7%. The percentage of agreement on time to complete a salad was 100%. The percentage of agreement on number of salads prepared by co-workers was 100%.



Agreement on quality-control checking by trainees was also assessed. Two observers independently recorded the occurrence of checking behavior and error correction during test sessions. Data were compared on a step-by-step basis. Agreement was calculated by dividing the number of agreements by the total number of agreements and disagreements and multiplying by 100. The percentage of agreement on checking behavior ranged from 87.5% to 100%, with a mean of 94%. The percentage of agreement on error correction ranged from 75% to 100%, with a mean of 90%.

### *Procedures*

Procedures for implementing training were the same as described in Study 1. However, rather than increasing the number of steps to be trained gradually, the trainees were trained on all steps.

**Baseline.** The baseline condition was the same as that described in Study 1.

**Coincidental training alone and coincidental training with quality-control checking.** Two training procedures were used. The first procedure, coincidental training, included the same procedures used in Study 1: antecedent modeling, instructions, modeling, and practice. In the second training procedure, quality-control checking was added to the coincidental training procedure. Each trainee was taught half of the salad-making steps with the basic coincidental training procedure and half of the salad-making steps using coincidental training plus the quality-control checking component. The trainee who received training first was different each day.

Both coincidental training procedures were continued until a difference in accuracy of 25% was observed between the two sets of salad-making steps for seven of eight consecutive test sessions. Then, the more effective procedure was used for both sets of salad-making steps.

### *Experimental Design*

The effects of coincidental training with quality-control checking and coincidental training without checking were compared using an alternating treatments design between groups of steps (Barlow &

Hayes, 1979) and a multiple baseline design across trainees. Marcia and Lois were trained using the first procedure on the first half of the salad steps and the second procedure on the second half of the salad steps; Doris was trained using the second procedure on the first half of the salad steps and the first procedure on the second half.

### *Social Validation of Trainee Performance*

The two measures of social validity described in Study 1 (i.e., supervisor ratings and time to complete salads by trainees compared to experienced workers without disabilities) were used to determine whether the changes in behavior of the trainees approached competitive performance levels (Kazdin, 1977).

## RESULTS

### *Accuracy*

Figure 2 presents the percentage of steps completed correctly by the trainees during test sessions across experimental conditions. During baseline, Marcia averaged 13% of the steps completed correctly for the first half of the salad steps and 9.1% for the second half. Doris averaged 1.3% of the steps completed correctly for the first half and 2.6% for the second half. Lois' mean performance level for both halves was 3.7% of the steps completed correctly per salad.

During the last five test sessions of the first training condition, Doris correctly completed an average of 83% of the steps on the half with quality-control checking and 23% on the half without quality-control checking. Marcia averaged 93% on the half of the salad trained with the checking procedure and only 33% on the half of the salad using the basic training procedure. Lois' mean performance level was 95% on the half of the salad with quality-control checking and 50% on the half without checking.

In the final training condition, when quality-control checking was added to coincidental instruction for all steps, mean performance levels for Marcia were 95% of the steps completed correctly on the first half and 93% on the second half. Mean

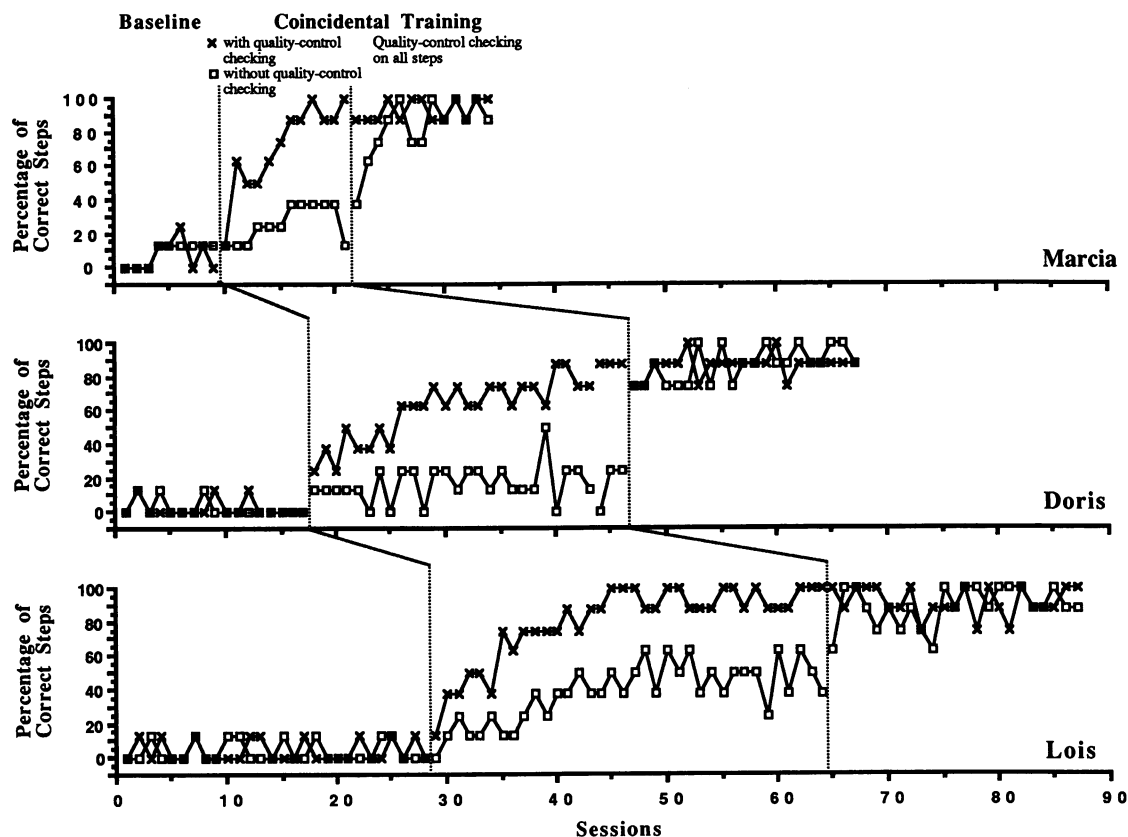


Figure 2. Percentage of steps completed correctly for each half of salad during test sessions.

performance levels for Doris and Lois were 95% of the steps completed correctly on the first half and 88% and 95%, respectively, on the second half.

Quality-control checking data were collected during test sessions to verify whether trainees checked the correctness of each step of the salad. During baseline, Marcia and Lois checked an average of 6% to 12% of the steps across both halves and Doris checked none of the steps. At the end of the first condition, the trainees checked an average of 80% to 90% of the trained steps. Quality-control checking on untrained steps increased slightly for all workers. Marcia and Doris checked approximately 15% to 18% of the untrained steps and Lois checked an average of 27.6% of the untrained steps. When quality-control checking was added to coincidental training for all steps, Marcia and Doris checked 70% and 65% of the steps during the first five sessions, respectively. Lois checked

approximately 63% of the steps. Quality-control checking on previously untrained steps increased to 75% to 100% for all trainees and was maintained throughout the study.

#### *Time to Complete a Salad*

During baseline, Marcia completed salads in approximately 12 min; Doris averaged 17 min. Lois averaged approximately 5 min to complete a salad.

When quality-control checking was taught with half of the salad steps, Marcia and Doris required 2 to 3 min more than in baseline to complete a salad; Lois' mean completion time more than tripled (16 to 18 min).

Time to complete a salad increased to an average of 15 min per salad for trainees during the second training condition; that is, 5 to 6 min more than for experienced kitchen workers. However, the trainees' range of task completion times overlapped with that of the regular experienced workers.

### *Co-worker Work Rate*

The co-workers prepared an average of four to five salads per minute during baseline, three to four salads per minute when the first training condition (quality-control checking for one half of salad) was introduced, and four to five salads during the final training condition (quality-control checking for both halves of the salad).

### *Social Validation*

As in Study 1, managers evaluated at least three salads of each trainee during each experimental condition. During baseline, managers indicated that Marcia completed approximately 18.8% of the salad steps correctly. Doris and Lois averaged 10.5% and 12.5% respectively. None of the salads of the 3 trainees were considered adequate to sell. Moreover, the managers indicated that all workers required additional training. During the first training condition, the managers indicated that Marcia completed an average of 40.8% of the steps correctly. Lois averaged 63.0% and Doris averaged 48.8% of the steps completed correctly. Managers noted that they would continue to train all 3 trainees and that more than half of the salads were saleable. During the final training condition, all the salads were considered saleable and little or no training was recommended.

### DISCUSSION

These studies examined whether co-workers could teach trainees with mild and moderate mental retardation to make a chef salad using coincidental training and a quality-control checking process without substantially decreasing their own production. In Study 1, the coincidental training procedures used by co-workers increased the salad-making skills of the trainees. However, acquisition was very slow. The participants required an average of 20 training sessions to learn 40% of the steps. To increase acquisition of the salad-making steps, two procedures were added to the coincidental training sequence, a model and a quality-control check. Linda required an additional 21 training sessions, and Shirley and Mary required 33 training sessions, to meet an 80% performance level. High levels of

performance were sustained during the follow-up conditions.

The maintenance of high-quality work throughout the follow-up sessions may be attributable to a number of factors. First, after the trainees learned to evaluate and to correct their performance, they required less supervision from the co-workers to maintain their work quality. Second, the trainees were trained to a strict performance criterion on each step. Overlearning may have occurred, resulting in sustained work performance by the trainees over the 1- to 2-month follow-up period. Although all trainees performed consistently once training was discontinued, it is not clear whether performance would have been maintained had the study been extended for a longer period.

In both studies, trainees required more time to complete a salad than did the experienced workers without disabilities. A decrease in production level was particularly evident when trainees initially began to quality-control check. However, at the end of training in each study, the trainees still averaged a minimum of 5 to 6 min more per salad than the workers without disabilities.

Our findings are limited in several respects. First, training was limited to one task. It is not clear whether the training procedures would be equally effective with other tasks. Further, the procedures described in these studies may not be appropriate or sufficiently comprehensive for all job situations. Work environments and tasks vary significantly and frequently dictate the type and extent of job training possibilities. For example, coincidental training might be used to teach busing skills in restaurants that have two or more busboys on the same shift. However, a different training format may be more suitable for a janitorial position in which co-workers frequently work in separate or isolated areas. Systematic replications will be necessary to determine the applicability of these procedures to various vocational tasks and job situations.

Second, the co-workers in this study were not indigenous employees of the restaurant but were college students hired specifically for this research. This may limit our findings because many entry-level co-workers are likely to be less well educated and may have different attitudes toward persons

with mental retardation than these co-workers. It should not be assumed that entry-level workers in general will be as easily trained, be as willing to serve as trainers in addition to performing their regular job responsibilities, or will implement the instructional procedures as well as the co-workers in these studies. Nevertheless, the majority of studies examining co-worker involvement with persons with developmental disabilities have been conducted in university settings (e.g., university food services, kitchens, and hotels) (Crouch, Rusch, & Karlan, 1984; Rusch & Menchetti, 1981; Rusch *et al.*, 1980; Schutz, Jostes, Rusch, & Lamson, 1978). Those reports contain little or no description of co-worker characteristics and selection, but it is possible that the co-workers in these earlier studies do not differ substantially from the co-workers in our study. Thus, although the controlled conditions in our study may limit the generalizability of our findings, they allowed us to identify the training procedures necessary for effective training by co-workers. If co-worker-implemented training is to be widely applied, future research must evaluate procedures with a broader range of co-workers that is more representative of the general population.

Third, although our co-workers applied sophisticated instructional techniques, a professional determined the skill to be trained and the type of procedure to be used. It is not clear that the co-workers would have applied appropriate instructional procedures without this assistance. Perhaps extensive professional support will be required if large-scale vocational mainstreaming of persons with moderate and severe disabilities is to occur. Other researchers (Rusch & Menchetti, 1981; Shafer, 1986) have suggested that the primary responsibility for task acquisition should be left to employment specialists (e.g., job coaches), whereas co-workers may be better prepared to assume responsibility for skill maintenance and/or generalization. Additional research is needed to determine the appropriate roles of professional trainers and co-workers in community-based employment of workers with mental retardation.

Fourth, our studies focused on teaching job skills to employees with mental retardation. However,

some workers with disabilities may need training in social skills and time management (Salzberg *et al.*, 1986). Research indicates that these skills may not be as easily taught as job tasks.

Finally, the length of training time was a concern in both Studies 1 and 2. Typically, new employees in entry-level positions are expected to learn a job in 1 to 2 weeks (Izzo, 1985). In these studies, training time far exceeded the competitive employment norm. In part, the increased time may have resulted from the structure imposed by the study. For example, workers without disabilities often prepared 6 to 10 chef salads at a time, whereas the trainees completed only one test salad and one training salad per day. Thus, their learning opportunities were limited compared with the usual job training process. Further, if the trainees were taught to check all steps at the beginning of Study 2, acquisition time might be substantially reduced. Additional research must examine the relation between opportunities to respond, quality-control checking, and length of training time.

Coincidental training offers promise as one strategy that may be used by co-workers or job coaches to teach work skills to persons with mental retardation. Our research, although limited, illustrates the extensive instructional decisions that are required in on-the-job training. It is premature to recommend broad implementation of this or other co-worker training strategies. However, it is clear that co-workers are likely to be important to employment success of workers with mental retardation and that they can be potent allies in the on-the-job training and job retention process. The knowledge required to use co-workers most effectively and to prepare them for those roles awaits further research.

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